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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/386,247	08/31/99	TOREK	AS

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EXAMINER

TRAN, B

ART UNIT	PAPER NUMBER
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1765

DATE MAILED:

05/22/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/386,247

Applicant(s)

TOREK ET AL.

Examiner

Binh X Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-9, 15-35 and 41-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-9, 15-35 and 41-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 6-9, 15-35 and 41-62 in Paper No. 3 is acknowledged.

Claim Objections

2. Claim 53 is objected to because of the following informalities: In line 1 of claim 53, "ozone-rice" (emphasis added) appears to be a typo error for --ozone-rich--.
Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6-9, 15-35 and 41-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosofsky et al. (US 5,803,982) in view of Nakahori et al. (US 4,517,849).

Kosofsky discloses an apparatus comprising:

an ozone source (ozone generator 166) configured to supply ozone to a process chamber (compartment A-F) (col. 8 lines 32-47);

a sprayer (wand 96) connected to a fluid source such that the workpiece (i.e., object to be washed) in the process chamber (col. 6 lines 36-45, Fig 6);

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a pump (104) connected to the fluid source (See Fig 6);

a selector valve (130) connected to the pump (Fig 6, col. 7 line 65 to col. 8 line 24).

Kosofsky does not disclose that the selector valve configured to selectively pulse the fluid through the sprayer. In a ozone cleaning apparatus, Nakahori teach a valve selector (11 and 9) connect to the pump, the valve configured to alternates the sampling ozone fluid of the ozone intermittent generator (col. 2 lines 38-50, read on the limitation "valve configured to selectively pulse the fluid through the sprayer).

It would have been obvious to one of ordinary skill in the art, at the time the invention, to modify Kosofsky in view of Nakahori by using a valve to pulse the fluid through the sprayer because this will allow more flow control and more flexible in checking whether the spraying step is finished. Further Kosofsky is not particular whether his fluid is flow continuous or non-continuous (i.e., continuous vs. pulse), therefore pulsing would produced an expected result.

Kosofsky is silent whether the workpiece is a semiconductor wafer (claim 7). It would have been obvious to one of ordinary skill in the art, at the time the invention, to use the semiconductor wafer since Kosofsky is not particular about the specific kind of the workpiece. Further spraying a semiconductor with ozone containing fluid is well known in the art (See prior make of record).

Respect to claims 8-9, Kosofsky teaches turntable (670) to hold the objects (col. 17 lines 50-65, col. 18 lines 27-40, read on the cassette is configured to rotate).

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Kosofsky does not disclose a plurality of semiconductor wafers. However using a plurality of wafer is well known.

Respect to claim 16, Kosofsky does not disclose the velocity of the turntable (670) (i.e., rotator). The rotation per minute parameter is commonly determined by routine experiment. The process of conducting routine optimization experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one of ordinary skill in the art, at the time the invention to modify Kosofsky by perform routine experiments to obtain optimal result. Further Kosofsky is not particular about the specific number of rpm and therefore any number would have produced an expected result.

Respect to dependent claims 17, 27 Kosofsky teaches at least one processing chamber wherein ozone rich environment exists within the object processing chamber; and a sprayer, a pump connected to the chamber. Kosofsky does not teach pulsing fluid source, the fluid source configured to pulse a solution through the sprayer into the ozone rich environment and/or the pump configured to pulse a solution.

In a ozone cleaning apparatus, Nakahori teach to alternate the ozone fluid of the ozone intermittent generator (col. 2 lines 38-50, read on the limitation of "the pulsating fluid source configured to pulse a solution through the sprayer into the ozone rich environment").

It would have been obvious to one of ordinary skill in the art, at the time the invention, to modify Kosofsky in view of Nakahori by pulsating the fluid because this will allow more flow control and more flexible in checking whether the spraying step is

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finished. Further Kosofsky is not particular whether his fluid is flow continuous or non-continuous (i.e., continuous vs. pulse), therefore pulsing would produced an expected result.

The "semiconductor" limitation of claim 27 has been discussed in previous paragraphs. Respect to claim 18, Kosofsky disclose the solution is ozone rich. The limitation claim 29 has been discussed in previous paragraphs.

Dependent claims 21-26 and 30-35 differ from the cited prior by the specific number pulse per unit of time, duty cycle. These parameters are commonly determined by routine experiment. The process of conducting routine optimization experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, It would have been obvious to one of ordinary skill in the art, at the time the invention, to perform routine experiments to obtain optimal result. Further the selection of particular values for these parameters is simply a design choice base on routine experiments.

Respect to claims 41, Kosofsky does not disclose the pump configured to pulse a solution into the processing chamber. Nakahori discloses a pump and valve configured to pulse the solution into the chamber.

It would have been obvious to one of ordinary skill in the art, at the time the invention, to modify Kosofsky in view of Nakahori by configuring the pump to pulse the solution because fluid because this will allow more flow control and more flexible in checking whether the spraying step is finished. . Further Kosofsky is not particular whether his fluid is flow continuous or non-continuous (i.e., continuous vs. pulse), therefore pulsing would produced an expected result.

The limitation of claim 42 has been discussed. Kosofsky does not teach the pump activates and deactivates to create the pulse (claim 43); or the pump further comprises a switching mechanism to create the pulse (claim 44); or the switching mechanism comprises a device configured to divert solution from one area of the processing chamber to another area. Nakahori discloses that the pump can be stopped and actuated to create pulse (i.e. alternate) (col. 2 lines 51-55, read on "activates and deactivates the pump"). Nakahori also teaches a valves (11 and 9, i.e, "switching mechanism"

It would have been obvious to one of ordinary skill in the art, at the time the invention, to modify Kosofsky in view of Nakahori by activating and deactivating pump, using switching mechanism to divert solution because this will more flow control and more flexible in checking whether the spraying step is finished. . Further Kosofsky is not particular whether his fluid is flow continuous or non-continuous (i.e., continuous vs. pulse), therefore pulsing would produced an expected result.

Respect to claim 46 Kosofsky discloses pumping a solution into an ozone rich environment to create an ozone rich solution (See Fig 6). The limitation of a pulsator has been discussed in Nakahori's reference in previous paragraph.

Respect to claim 47, Kosofsky disclose a spray nozzle (i.e., spraying wand). Kosofsky teach the solution is water (claim 48).

Claims 49-52 differ from the cited prior art by the specific temperature of the solution. Temperature parameter is commonly determined by routine experiment. The process of conducting routine optimization experiments so as to produce an expected

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result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one of ordinary skill in the art, at the time the invention, to conduct routine experiments to determine optimal condition as expected result.

Respect to claims 54 and 62 Kosofsky teaches a turntable 670 that is configured to rotate a work-piece (read on a rotating platform). All other the limitations of claims 53-62 have been discussed in previous paragraph.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fukazawa et al. (US 5,868,855) teach treating a semiconductor substrate with ozone solution.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-3599 for After Final communications.



**ROBERT KUNEMUND
PRIMARY EXAMINER**

Binh X. Tran
May 21, 2001